

REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 1-12 continue to be active in the application subsequent to entry of this Amendment. Selected claims have been amended in order to more particularly point out and distinctly claim that which applicants regard as their invention and to respond to the issues raised in item 4 of the Official Action. In addition, the examiner's miscellaneous comments in item 10 have been taken into account and appropriate adjustments made to claims 1 and 11. It is submitted that the revised claims presented above are compliant with 35 USC §112, second paragraph. Favorable consideration is requested.

Item 5 (& Item 9)

Referring to the Examiner's objection that claims 1, 2, 4, 6 and 9-11 are anticipated by JP 9-289081 (JP '081), the Applicant wishes to thank the Examiner for her assistance in further elaborating the nature of that objection in Item 9 of the Action. The Examiner has explained that she considers that the hole transporting layer in JP'081 is capable of **inherently** providing the three functions of the Applicant's "single organic layer", thereby allegedly reading onto claim 1. In order to overcome this, the Examiner has kindly suggested a form of revised wording for claim 1 in which the layer structure between the anode and the cathode is comprehensively defined (using "consists of" terminology) in terms of the single organic layer, with optional electrode modifying layers dispersed either side of that organic layer.

The Applicant has amended claim 1 having regard to the Examiner's points. However, the Applicant respectfully submits, for the record, that the novelty objection based on JP '081 is extremely tenuous. As the Examiner concedes in Paper No. 5, **none** of the prior art working examples provide a device having a pyromethene -BF₂ complex in the hole transporting layer. Rather the

Examiner has to argue that “one of ordinary skill in the art... could at once envisage such a device given the prior art’s explicit teaching that the pyromethene –BF₂ complex may be in the hole transporting layers”. Moreover, not all of the preferred Examples of pyromethene - BF₂ complexes listed in Table 1 of JP ‘081 fall within Formula 1 of present claim 1. Accordingly, it is clearly arguable that the teaching of the present invention is still hidden within, and not made available, by the teaching of JP ‘081.

In order to expedite prosecution, the Applicant has nevertheless amended claim 1 substantially along the lines suggested by the Examiner. However, the optional electrode modifying layer adjacent the cathode has merely been defined as an “inorganic” layer (for basis see original page 6, 5th paragraph), since this will serve to distinguish that layer from the organic electron transporting layer 4 that is always present in the prior art device.

The Applicant has also taken the opportunity to insert a further independent claim, new claim 12, in which the electrode modifying layers are each disclaimed from exhibiting any of an electron transport, hole transport or light emitting function, so that said layers will not therefore read on to the organic electron transporting layer 4 of JP ‘081. Such wording implicit in the description of the invention clarifies what the skilled reader would immediately have understood from reading the discussion in the present specification of the respective roles and functions of the “single organic layer” and “electrode modifying layers”.

In view of the foregoing, it is submitted that new claims 1 and 12 are now clearly distinguished over JP ‘081. Correspondingly, claims 2, 4, 6, and 9 to 11 must now also be considered novel by way of their dependence upon claim 1.

Item 6

The Examiner also objects that claims 2-8 are obvious in light of JP ‘081 taken in combination with Zhang and Hung. Neither JP ‘081 or Hung or Zhang, whether read in isolation or combination, teach the use of a layer structure

between an anode and cathode as defined in amended claim 1. Thus, claims 2-8 must be considered both novel and inventive by way of their dependence upon claim 1 as above revised.

Item 7 (& Item 9)

The Examiner alleges that claims 1-4, 6, 9-11 are obvious in light of US 5,281,489 (Mori), when taken in combination with either US 5,189,029 (Boyer), DD 265266 Czerney (DD '266) or Applied Fluorescence Technology, June 1989, pp13-14 (Czerney). Applicant disagrees.

It is respectfully submitted that the Examiner's stance that the skilled addressee would extrapolate from Mori, and the art combined therewith, that it would be advantageous to employ the Applicant's specific boron compounds in a single layer device is unrealistic. The obviousness rejection is unjustified and has only been made with the benefit of hindsight. The question is not whether, in principle, the skilled addressee **could** have thought to try those compounds, but whether, in practice, he **would** have done so. This has not been shown.

Mori is merely an example of one of a number of prior art documents attempting to provide guidance as to how to select the components of a single layer OLED so as to arrive at an acceptable device. There is a trade off between single and multiple devices in that while the deposition of separate layers is costly, time consuming and difficult to control, two layer devices are known to be efficient in both energy and light output, which makes them a desirable product. Single layer devices, although cheaper to produce, in general have much lower efficiencies. Hence, the production of a single layer structure that is convenient and cheap to fabricate has been an outstanding problem. There is no indication in the prior art to suggest that the use of applicants' specific boron compounds will lead to improved efficiency of a single layer device. The present invention, contrary to the prior art (such as for example JP '081), makes available for the **first time** the teaching that it is possible to fabricate a cheap but nevertheless

efficient single layer device providing one employs applicants' specific boron compounds as the light emitter/electron transporter in the single layer.

An obviousness objection based on Mori might have been justified if Mori related to a single layer device in which a narrow class of light emitters were suggested for use, and then if, for example, Mori was combined with another document that flagged up that specific compounds within that class had especially desirable properties. But that is **not** the case. Instead Mori's teaching encompasses the use of nearly any light emitter: namely, it proposes the use of dyes for dye lasers, any fluorescent brighteners, or any compounds capable of exhibiting fluorescence upon ultra-violet radiation! After that broad teaching, Mori proceeds at length (from column 23 to column 25) to list a large number of suitable fluorescent compounds, none of which are similar to the Applicant's boron fluoride compounds. Accordingly, Mori is of little relevance other than the fact it represents a single layer device in which nearly every conceivable light emitter is suggested for use.

The skilled addressee reading Mori and faced with the task of optimising the choice of light emitter, would need some incentive to select a particular compound, especially one not mentioned in the lengthy list in Mori. Even if the skilled addressee chose to confine themselves to laser dyes, why would they choose to employ any of the documents the Examiner has cited (with hindsight)? Why would Boyer – which is entitled “Indacene compounds and methods for using the same”, and relates to compounds for use as laser dyes and as photochemical agents for treating tumours – be of interest to the skilled addressee? To cite prior art documents relating to specific laser dyes is wholly unjustified unless the Examiner can show why that document would have been selected. The law is clear that, in determining motivation to combine prior art references, the nature of the problem to be solved must be taken into account, as confirmed *In re Rouffet*, 47 U.S.P.Q.2d 1453 at 1458 (July 1998) where the court noted:

“In other words the Examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.”

The Official Action does not explain why the skilled addressee would expect improved efficiency in a single layer device by selecting the Applicant's particular compounds, which it should be noted are confined within narrow formulae. The mere fact that the references could be combined is not enough. As stated by the Court *In re Fritch*, 23 U.S.P.Q.2d 1780, 1783-1784 (Fed. Cir. 1992) (emphasis added):

“The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggests the desirability of the modification.”

Thus, the mere fact that Mori could be combined with any art relating to laser dyes does not render the resultant possible combinations obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); MPEP 2143.01. Hence, the Examiner's attempt to combine Mori with Boyer or Czerney or DD '266 – without any suggestion in the references as to the desirability of the combination – is improper and should be withdrawn.

Item 8

Regarding the Examiner's objections to claims 5, 7 and 8, those claims are allowable at least by virtue of their dependence upon claim 1.

Item 9

Regarding Mori and the Examiner's comments on the need for comparative data covering all the compounds specified in claim 1, and the need to justify the Applicant's selection, it is respectfully submitted that those objections would only

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June 15, 2004

be justified, and such data would only need to be supplied, where the original obviousness objection in Paper No. 5 was justified. Since, however, Paper No.5 gives no motivation to combine the cited prior art references, the original objection is improper and should be withdrawn.

Item 10

The claims have been revised to take account of each objection.

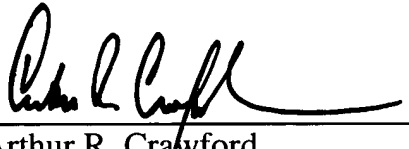
Please also see the concurrently filed Information Disclosure Statement based upon a Search Report issued in the priority UK application. There are five documents listed, but one of these is the Japanese document with which the examiner is already familiar. Please consider this information and take it into account during further examination of the claims of this application.

Reconsideration and favorable action are solicited. If for any reason the examiner requires further information, please contact the undersigned by telephone.

Respectfully submitted,

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